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Established 1835 — Railway & Commercial Gazette

Vol. CCXXXVII No. 6060 — LONDON, OCTOBER 12, 1951 — PRICE 8d

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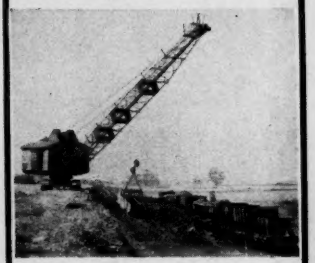

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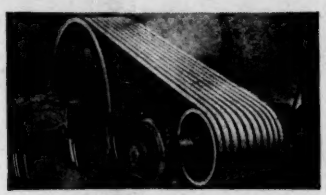

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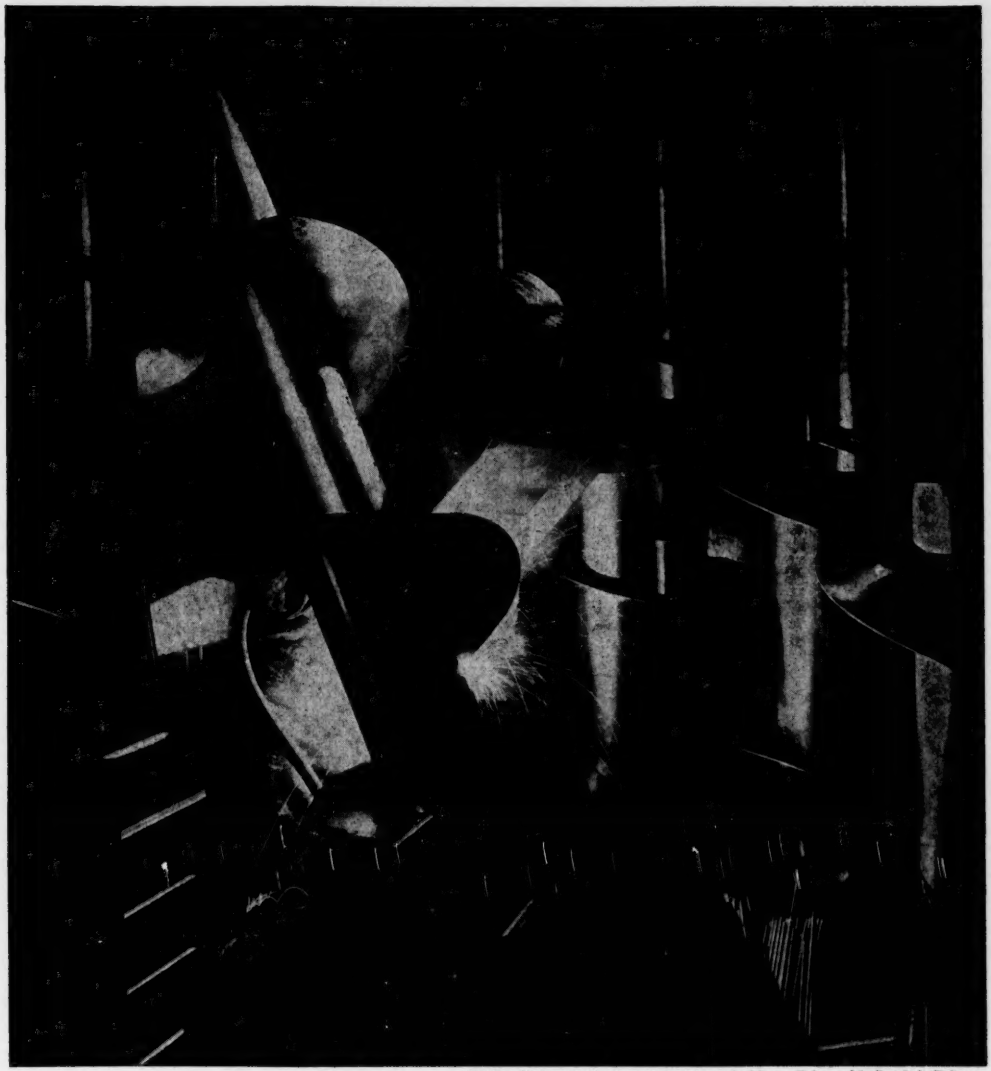

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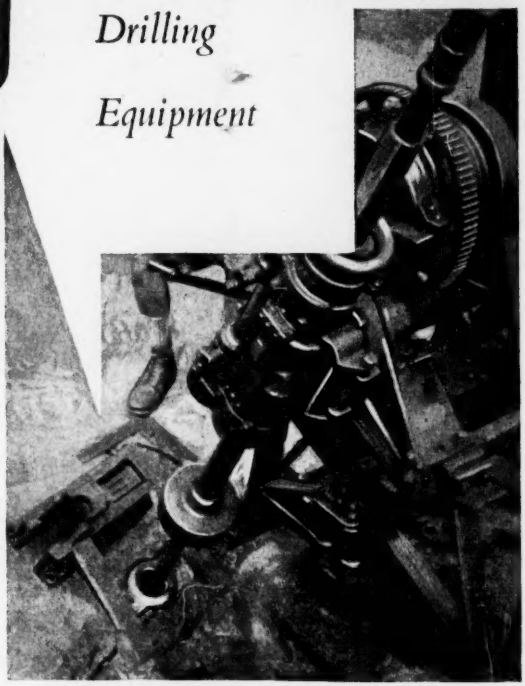

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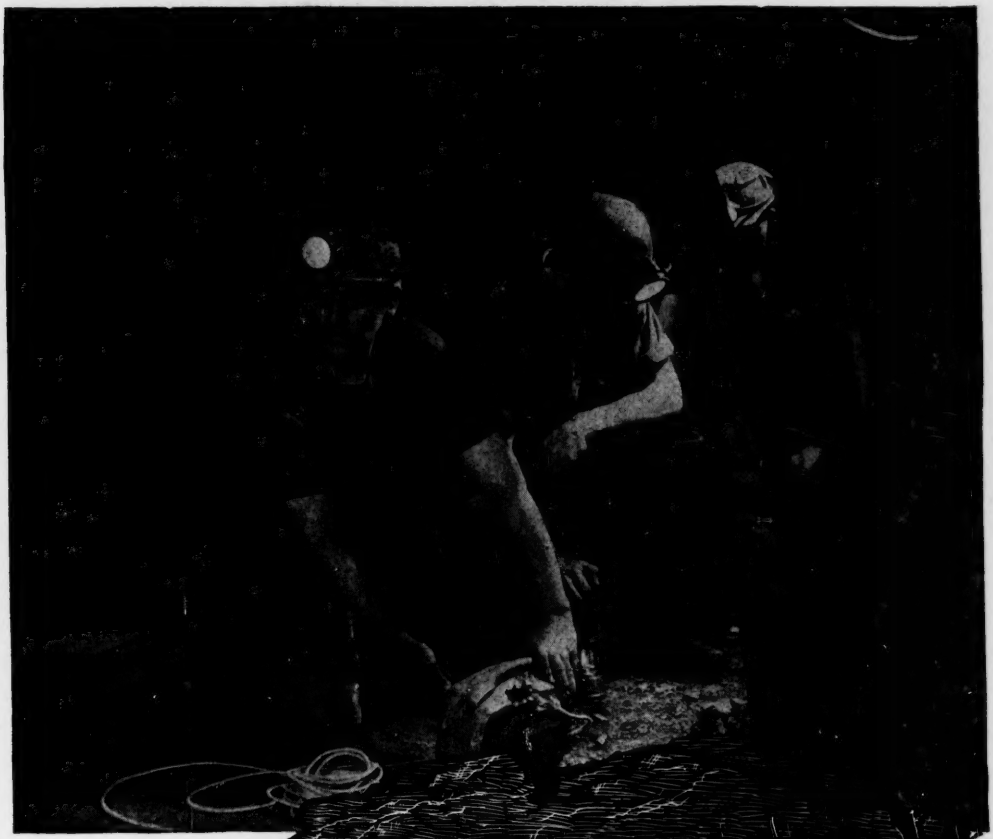

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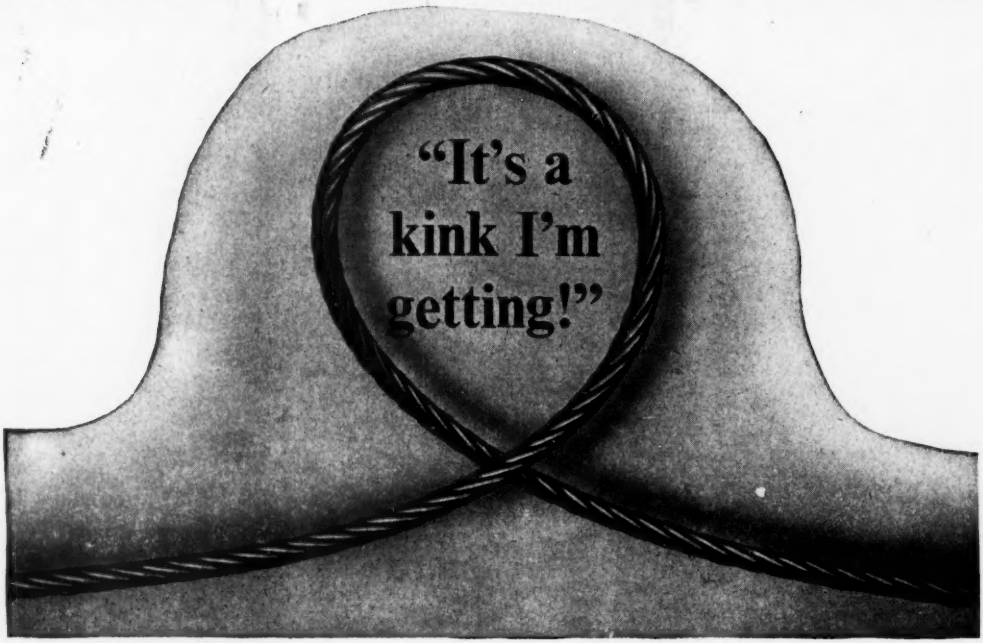
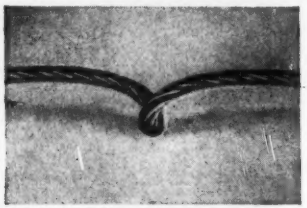
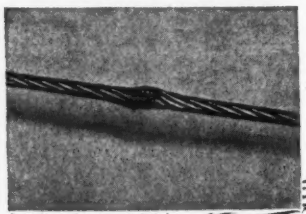


HOW NOT TO STRAIGHTEN OUT A KINK



The loop is almost removed — by force.



Straightened out — or is it? Notice the distortion of the strands — it spells trouble ahead.

Let's hope somebody sees this wire rope in time.

It only needs 'unkinking' but the offending loop *must* be 'lifted' out by hand. If it is merely pulled tight, the rope may *seem* to straighten itself but closer examination will show serious distortion of the strands — as the illustrations reveal. The application of a load does not remove a kink — it merely distorts the rope and permanently impairs its efficiency.

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The Mining Journal
Established 1835

Vol. CCXXXVII No. 6060 LONDON, OCTOBER 12, 1951 Price 8d.

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Published by The Mining Journal Ltd. at 15, George Street, London E.C.4. *Subscription £2 per annum (post free)*

NOTES AND COMMENTS

Canada to Carry Out St. Lawrence Seaway Project Alone

After so many rumours and counter-rumours that Canada and the U.S. would jointly construct the St. Lawrence Seaway and Power project, it is welcome news indeed that we learn that Canada will, if necessary, proceed with the project alone. This was made known after the Canadian Prime Minister, Mr. St. Laurent, had discussed with President Truman in Washington the whole question of the proposed St. Lawrence Seaway project. President Truman said that while he strongly preferred joint action on the project and hoped that Congress would soon authorize U.S. participation, he would support a proposal that Canada build the Seaway herself if the project could not be achieved as a joint effort. In the past, Congress has been the chief stumbling-block to joint action and failed to ratify the 1941 agreement between the two countries, which involved the planning of the Seaway project along with a power project.

However, a new Bill was introduced to Congress last week to carry through the project with provisions that the programme would pay for itself. This would be effected by Canada approving tolls designed to make the works self-supporting and self-liquidating.

But not much comfort can be derived from this development. The Seaway project has been the subject of several Bills presented in the past, all of which have come to naught, largely because of strong opposition from U.S. interests which felt that the Seaway's completion would materially affect their well being. The latest opposition comes from one of the vice-presidents of the U.S. Mineworkers of America, Mr. Thomas Kennedy, who raised in the new form the statement made by Mr. John L. Lewis more than ten years ago, that "The United Mineworkers insist that electricity generated by the St. Lawrence project will displace coal."

In the speech from the throne at the opening of the Canadian Autumn Session of Parliament, it was stated that Parliament would be asked to authorize establishment of a federal agency to deal with the construction of the seaway.

How soon Canada will begin work on the Seaway and Power project has not been officially announced. It is thought, however, that work is most likely to begin on the Power project first, as the need for electric power in the Province of Ontario is said to be urgent.

Meanwhile, details of development at Ungava were given by Dr. J. A. Retty, chief geologist of the Iron Ore Co. of Canada. He said that its development required the construction of a deep water port at Seven Islands, which would also serve as one terminal in the 340-mile railway now under construction between Seven Islands and the ore areas. It is expected that the railway will be completed and deliveries of ore begun by 1954. Mr. Retty estimated that the ore would be delivered in quantities of between 10 and 20 million tons yearly. One possible delivery route, he said, could be from Seven Islands to Montreal by ship and from there by rail to Canada's mid-west. Alternatively, the ore could be shipped from Montreal to Cornwall or Prescot, Ontario, where it could be loaded into the large Great Lakes freighters using the Welland Canal. Presumably, these alternative facilities were pointed out by Mr. Retty to show that the success of the Ungava ore development plan does not necessarily depend upon the completion of the St. Lawrence Seaway project. But there can be no question of the advantages of being able to ship the ore direct from the deep water port at Seven Islands to the centres of the Canadian iron and steel industry without having recourse to trans-shipment.

In any event, the issues involved in the Seaway project go far beyond the transportation facilities it will afford iron ore development at Ungava. Its construction would provide a strategic and naturally protected highway into the heart of the Dominion, thereby providing the much needed East-West link to bring oil and grain and raw materials from the Canadian west in exchange for the minerals and manufactured goods from the east. Moreover, it brings within the range of practical politics, closer links with Europe and the establishment of a large-scale shipping industry on the Great Lakes all of which, in the longer run, must lead to the emergence of Canada as something more than its present status as a "middle power."

The I.M.F. and Gold Sales

The following is the full text of the statement made by the Managing Director of the International Monetary Fund, Mr. Ivar Rooth, at the recent meeting of the Directors in Washington.

"In June, 1947 the Fund issued a statement recommending to members that they take effective measures to prevent external transactions in gold at premium prices. To-day, the Fund issued a new statement on external transactions in gold which modifies the previous statement in certain important respects.

"It will be helpful to see what the background was at the time the original statement on premium gold transactions was issued. The initial par values had only been recently agreed and were not yet tested under post-war conditions. Total dollar receipts from exports to the United States were running at a rate of about $5.5 billion a year. Monetary reserves outside the United States were declining rapidly. The payments difficulties that led to the Marshall Plan were already visible. In these circumstances the statement by the Fund helped to focus the attention of members on the dangers of an unrestricted flow of gold into hoards and was useful in limiting the supply of gold to premium markets. As world economic conditions improved in late 1949 and 1950, the flow of gold into hoards tended in fact to subside. Since Korea, however, it has again become larger.

"Although the balance of payments and the reserves of many countries have improved considerably in the last two years, there are a number of countries in which payments difficulties persist. These difficulties are not as large or as widespread as those of four years ago. Because of these difficulties, the Fund believes that a sound gold and exchange policy by its members continues to require that to the maximum extent practicable, gold should be held in official reserves rather than go into private hoards. It is only in this way that the monetary authorities can use gold to meet balance of payments needs.

"The fund has been studying premium sales of gold and the drain on reserves caused by the absorption of gold into private hoards. We found that to reduce materially the volume of gold transactions at premium prices, many members would have to institute much more rigorous controls than they now have. And we found that the position of different countries vary so widely that it would be impracticable to expect all members to take uniform measures to make the 1947 gold statement effective.

"The new statement, therefore, affirms the belief of the Fund that to the maximum extent practicable gold should be held in official reserve rather than go into private hoards. The Fund urges its members to support this view. It is left to members, however, to decide on what practical operating measures they will take in this field. Each member will be the judge of just how and to what extent it will implement this statement. So far as premium sales are concerned, they do not come within the purview of the statement so long as they are not designed to direct gold into private hoards. Members are required under the Fund Agreement not to buy gold at premium or sell it at a discount.

"With the new statement, members are not bound to any particular procedure for handling their external transactions in gold. They are not limited to the sale of any specific amount of gold or to any particular proportion of their newly-mined production. Probably some countries will now sell gold that did not engage in such operations before. Other countries may continue to sell the same amounts as they did before. And some countries may even reduce the amounts they had previously been selling.

"It may be that in a world of constant political disturbances, it is impossible to eliminate entirely private hoarding of gold. Nevertheless, our experience with the gold statement of 1947 leads me to two conclusions. First, controls as such can have only a limited effect unless they are reinforced by appropriate domestic policies. In a period of acute difficulty, the imposition of strong controls to prevent premium gold transactions can be justified. But as time goes on, they gradually lose their effectiveness as means of evasion and avoidance are devised. When this happens, they cannot be made to work by asking countries to impose more and more onerous restrictions.

"Second, the only dependable way to get rid of premium gold markets and private hoarding of gold is to create the economic conditions under which the private demand for gold will become negligible. In some countries, where gold is hoarded as a matter of tradition, the development of strong banks and sound financial institutions will encourage people to hold more of their savings in banks or securities or invest them in productive enterprises. In every country, the best way to reduce the demand for gold for private hoards is to follow budget and credit policies that will give people confidence in their currency. Nobody can have a good reason for hoarding gold or paying a premium for gold in a country in which the currency will remain stable in internal and external value.

"The Fund will, of course, continue to study premium prices and gold hoarding. It will watch developments in these fields. It will consult with members on any problems that may arise. And it will, in this as in all other international payments problems, emphasize at every opportunity the fundamental importance of preventing inflation."

N.C.B. to Build New Froth Flotation Plant

The large measure of success which has attended the laboratory experiments carried out over the last two years by the National Coal Board to develop further the process for upgrading coal slurry and its specialized application in the preparation of super-clean coal, has led the Board to propose building a new up-to-date plant designed to produce such clean coal at the rate of 20 to 30 tons per hour, at Dumbreck, Lanarkshire, Scotland. The work of developing the froth-flotation process has been carried out by Dr. P. L. Waters, Scottish division analyst, and Mr. Hindmarch, the area chief scientist.

At a demonstration of the froth-flotation process, Dr. Waters said that the process played two important roles in coal preparation, the upgrading of slurry and the preparation of super-clean coal. He said that there was a growing realization that fine coal—now that many of the problems associated with its cleaning had been overcome—could be utilized in several different ways, such as in the form of briquettes for industry and home use, and could, in fact, be just as valuable as the larger sizes of coal.

The building of the proposed new plant will mean a good deal to the Scottish coal mining industry. Approximately 10 per cent of Scotland's annual output of 24,000,000 tons is slurry, but at present very few of the collieries have froth-flotation facilities and it is impractical and uneconomic to transport the slurry to those collieries which have such facilities. Although the industrial application of froth-flotation as a means of cleaning fine coal is rapidly increasing, only a little over 5 per cent of the coal preparation plants in Britain have froth-flotation units installed. Thus, any proposal to increase the utilization of slurries, thereby converting what is, in many ways, considered as waste material into a useful and saleable fuel, is obviously of importance to this country, particularly now when consumption is more than keeping pace with production.

South Africa and the Gold Price

(From Our Own Correspondent)

Johannesburg, October 3

The major topic of conversation in both mining and financial circles is undoubtedly the statement of the International Monetary Fund which allows the gold producing countries to make their own arrangements for sales of gold at premium prices for industrial and artistic purposes. As usual in such matters, the immediate reaction was the appearance of two schools of thought—one seeing the diversion of our entire output to this end, and the other visualizing the virtual disappearance of the premium in a free for all.

PREMIUM SALES INSULATED FROM FREE MARKET PRICE

The end result, however, is likely to be entirely different. Leading authorities of the mining industry express the view that it will take many months before the position is clarified, and that some system will be evolved to keep the supply of gold for this purpose in step with demand.

In order to assess the position two basic facts must be kept in mind. Firstly, no sales of gold are made directly by South Africa in the so-called "free market" where gold changes hands for hoarding or monetary purposes in the form of bullion. Gold in this market is, for the greater part, derived from fabricated gold which, in the first place, has been sold for artistic and industrial purposes. The second consideration is that the manufacture of gold articles in this country is not conducted by the mining industry. It is done in private factories which are controlled by the Government. The actual premium received by the mining industry arises from the higher price paid by these factories for raw gold. This premium, therefore, is not directly influenced by the short-term fluctuations of the "free market" price.

Up to the present, the Union to all intents and purposes has had the monopoly of this particular trade. Now, Southern Rhodesia, Canada, Australia, and to a lesser extent probably the United States, have the right to dispose of gold through this channel at higher prices.

MARKET NOT INSATIABLE

But the market is by no means insatiable and the indiscriminate production of gold articles could quite easily render the scheme uneconomic. The feeling here is that during the next few months some system of co-operation between the various gold producing member countries of the International Monetary Fund will have to be evolved—parallel in its functions with the Diamond Corporation which adjusts the supply of diamonds to world market demand. In this connection it is thought that Dr. J. E. Holloway, the South African Governor on the I.M.F., and Dr. M. H. de Kock, the Governor of the S.A. Reserve Bank, who have recently arrived back in this country from Washington will probably be meeting Mr. H. C. Havenga, the Minister of Finance, to discuss the implications of the I.M.F. decision and what steps should be taken towards achieving this measure of co-operation.

The maintenance of the *status quo* whereby the Union sells approximately 40 per cent by weight of its gold output at a premium is of greater importance than ever to the economic stability of this country and to the mining industry. On previous occasions, I have pointed out the seriousness of the impact of rising costs upon the mining industry since devaluation, and that it has been fortunate in that premiums from gold sales have offset them to an appreciable extent.

It can be readily appreciated, therefore, that a falling off in the market for fabricated gold could have almost disastrous effects upon the gold mines and reduce them in the foreseeable future to the parlous state in which they were in the period immediately preceding devaluation, when a number of companies were giving serious thought as to whether mining operations could be carried out much longer on a profitable basis.

It is to this point that the other countries will have to apply their minds, for the possibility of killing the goose that lays the golden eggs is a real one.

NEED FOR INTERNATIONAL AGREEMENT

Apart from the direct effects of dealings in indiscriminately fabricated gold articles upon the mining industry, it could have other repercussions. During recent months, South Africa's adverse balance-of-payments has been rising sharply; for the first four months of the current financial year it is estimated at £26,000,000. This has made itself manifest in the recent sharp decline in the country's foreign exchange resources and is giving rise to growing concern. The cause is the lifting of import controls on essential goods and machinery, much of which is for the new mines. A decline in revenue from premium gold sales would undoubtedly accelerate the exhaustion of current exchange resources and lead eventually to the re-imposition of controls and result in slowing up the opening of the new mines. These considerations as well as the fact that a "free for all" scramble by gold producing companies to sell gold for industrial purposes would have the same results throughout the world, make apparent the need for some form of international agreement.

It would not be fair to assume, however, that the demand in the "free" gold market is a static one and that the quota of gold to be disposed of at premium prices fixed by International agreement will be maintained on the basis of the total amount of metal—roughly South Africa's contribution in the past—but divided up among another countries as well.

Dr. M. H. de Kock, on his return to this country took the view that new buyers are likely to come into the "free" market and that the demand for free gold will increase, because the International Monetary Fund's decision has created the impression among many people that a higher official price for gold is imminent—although Dr. de Kock does not hold this view himself.

FREE MARKET WILL EXPAND

By and large, the view here is that the "free" market will expand as it is the reflection of the correct value of gold as opposed to the fixed "unrealistic" price of $35 an oz. As this market expands it must attract increasing quantities of the metal, which are derived from fabricated gold, with a subsequent benefit to the actual producers and the economies of the countries in which they operate.

In the meantime, the South African mining companies are not perturbed at the threat of competition in what since 1949 has been their almost exclusive field. So far the premium from industrial sales has been maintained at a steady level in spite of relatively violent fluctuations in the "free" market price of gold, since—as pointed out earlier—their system of selling largely insulates them against all except the long-term trend.

For the current year it has been estimated that the amount accruing to the industry will be about £9,000,000, which can be regarded as a most satisfactory figure.

To sum up, the gold producing countries must come to some agreement on a joint control of the sale of gold for industrial purposes and, in the long run, they can look forward to the expansion of the "free" market to an officially recognized institution where the metal will be dealt in at its real value against the price laid down by what Dr. Holloway has called the cheap gold countries.

Helicopters for Geological Surveys and Mineral Exploration

By Sir CYRIL S. FOX, D.Sc., F.G.S., Former Director, Geological Survey of India;
Past-President, Mining and Geological Institute of India.

Sir Cyril Fox recently undertook on behalf of the Egyptian Government the task of making a thorough geological investigation of the Wadi el Raiyan basin and adjacent areas, including the El Faiyum depression and the surrounding Western Desert. In the article which follows he gives a personal account of his experiences whilst surveying this area with a helicopter, and compares the small American machine which he was using with two United Kingdom manufactured helicopters, the Sikorsky 51 made by Westland Aircraft Limited, Yeovil, Somerset, and the Bristol 171, made by the Bristol Aeroplane Company, near Bristol, which he "tested" in July last. Of particular interest are the immense advantages afforded to the geologist by the ability of the helicopter to fly in all directions at low speeds, and to hover over any particular spot. This aspect is featured in the article as well as the kind of routine which the geologist can establish even when carrying out field work. Sir Cyril also describes the technique for air-to-ground communications between the helicopter and caravans especially adapted for the purpose, supplied by Roura & Forgas, Ltd., which company played a vital rôle in organizing all the equipment sent out from this country to Egypt. In conclusion, the author estimates the cost of large-scale geological surveys using helicopters.

At the beginning of July last I visited manufacturers of the Sikorsky 51 (Westland Aircraft Ltd., of Yeovil, Somerset) and of the Bristol 171 (The Bristol Aeroplane Co., near Bristol) to examine the latest types of hoverplanes or helicopters, for the purpose of recommending their use in subsequent aerial geological survey work. Performance of the two machines for all practical purposes appeared to me to be identical. Both can ascend or descend vertically, fly straight and level at a constant height at over 100 miles an hour, hover, that is, remain stationary, at any height from ground level up to 5,000 ft., and carry a pilot and three or four passengers in one flight, a distance of about 360 miles—any increase in range over this figure being dependent upon the ratio of passengers to petrol.

My own experience in these machines was to cruise along, maintaining constant height at approximately 80 miles an hour at a height of 800 ft.; to ascend quickly to 2,000 ft., and to hover at this altitude; then to descend rapidly and hover at barely 10 ft. above the ground. At one point in the test, the pilot flew down a narrow, deep valley, and after hovering for a time just off the ground, turned the machine practically in its own length, and rose vertically out of the valley, flew along until we approached the chimney of an old beacon, and hovered about it so that I could test the advantages of observing objects at height from the machine. But perhaps the most spectacular experiment was the emergency landing operation in case of engine failure carried out in Westland's Sikorsky 51. At 500 ft., the pilot switched off the engine, changed

(By Courtesy of Westland Aircraft, Ltd.)

Sikorsky 51—Manufactured by Westland Aircraft, Ltd., Yeovil, Somerset. The author, Sir Cyril S. Fox, is standing second from the left. Photograph was taken immediately after the crash landing test

the angle of incidence of the blades so that they were parallel to the ground, thus showing the greatest wind resistance (reverse of feathering) and tested the fall of the machine against the auto-rotational resistance caused by the freely revolving blades. The impact on landing was much the same as a fall from a height of five feet.

It is, in fact, impossible to convey the feeling of safety experienced in these tests, or to describe the sensation of moving easily and rapidly in any direction, while maintaining at all times excellent vision of the terrain below or around the machine. One further point which was important for me to discover was the take-off and landing

(By Courtesy of the Bristol Aeroplane Company)

Bristol 171—Manufactured by the Bristol Aeroplane Company, near Bristol

run required, and these machines, both of which are powered by a 550 h.p. Alvis Leonadas engine, effected these operations from a level portion of the ground no wider than 30 yards or so in diameter.

DIFFICULTIES OF A GROUND SURVEY

During my investigations of the Wadi el Raiyan area in January and February of this year I had used a Hiller 360, manufactured by the Hiller Helicopter Inc., Palo, Alto, California. This machine, with its 180 h.p. Franklin engine, was, of course, much smaller than either the Sikorsky 51 or the Bristol 171. It carried two persons, including the pilot, at an average speed of 75 m.p.h., its range being limited to about 150 miles, though another passenger could be carried at the expense of flying distance. Nevertheless, it was an exceedingly useful helicopter and saved me weeks of time on the one hand, and on the other, enabled me to observe geological details in the desert which I doubt could have been so fully discovered by a ground survey.

On my earliest visit to the Wadi el Raiyan in August 1950, accompanied by the most experienced of Egyptian engineers, we had spent a whole day attempting to find certain well-known springs by motor cars. Although the distance involved was less than 80 miles, we got stuck in sand dunes or soft sand, or had lost our way and after

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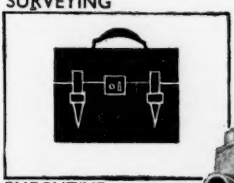

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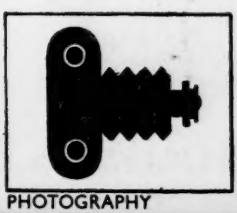

PHOTOGRAPHY

SWAMP LANDING

EUROPE'S LARGEST HELICOPTER FACTORY PRODUCING MACHINES OF ALL CAPACITIES FOR ALL PURPOSES

spending a whole day we only located two out of the three springs. Nor was this experience unique. Youssef Saad Bey, Inspector General of Irrigation Works, told me that he had had a similar experience, while the Director of the Egyptian Geological Survey, Dr. Atiah, explained to me that for the traverses made by the assistant geologists in the Wadi el Raiyan in 1946-7, it had often been necessary for them to "navigate" from one position to another from the maps available.

On our expedition we had to establish camps for the crews in the Wadi el Raiyan and to make the routes for the supply trucks easily discernible, the tracks which they were to take had been clearly marked. But despite these precautions, the lorries and trucks had often made astonishing detours—as we saw from their tracks when flying over in the Hiller 360. However, misfortunes are sometimes blessings in disguise, for it was partially due to the unsatisfactory results obtained from this ground survey that it was firmly decided that when I was to carry out my geological survey I should have at my disposal a helicopter and suitable caravans, with powerful towing vehicles, to be used as camps.

DAILY WORK ROUTINE ESTABLISHED

The area over which I was to carry out the geological survey—the Wadi el Raiyan—lies about 75 miles to the south-south-west of Cairo. It adjoins the famous Faiyum depression with its salt water lake, the Birket Qarun (the shrunken remnant of the historical fresh-water sea—Lake Moeris), but lies to the south-west of it in the Western Desert. At about the 100-foot contour, above sea-level, the Wadi el Raiyan has an area of roughly 300 square miles. It is also a basin, dry and desolate, which in places lies nearly 200 feet below sea-level, and which, if filled, should hold nearly 5 cubic miles of water. Although topographical and geological maps had been prepared of the Wadi el Raiyan, more details were required.

While a hangar for the helicopter was being built on the edge of the cultivated land of the Faiyum, at El Gharaq, close to the nearest part of the Wadi el Raiyan, the pilot, Mr. J. H. N. Greenshields, flew me each morning from Cairo. We used to take off from the Embaba flying ground about 7.30 a.m., climb till we could see the Giza Pyramids, and fly on a line straight over the Sphinx onwards. This bearing took us a little east of Lake Qarun and right across the rich, cultivated lands of the Faiyum, and, as we approached the desert, we picked up the landfall at El Gharaq Rest House. Our landing in the small courtyard always brought out the villagers, since it was necessary to circle and settle carefully in the small space.

By 10 a.m. we had refuelled (from a drum with the help of a small rotary hand-pump) and took off for the Wadi el Raiyan. First we flew to the boring camps to encourage the crews and to become familiar with the topographical features. At 1 p.m., we returned and after refuelling again explored along the edges of the Faiyum, and eventually flew back to Cairo in the evening. When the hangar was erected at El Gharaq, the pilot and the ground engineer, Mr. R. H. Bryant, stayed at the Rest House. I was then able to begin work before 8.30 a.m., and complete the afternoon's work between 2.0 and 5.0 p.m. Our flights crossed almost every part of the basin, and in a few days the pilot and I became familiar with the more prominent bluffs and buttes and sand dunes in the Wadi, and also in the adjoining areas. The rock formations, chiefly alternating beds of marl and limestone lying almost flat, all of Middle Eocene age in the Wadi, were clearly visible in the greater part of the basin. The horizontal stratification of the outcropping beds could be seen from a great distance and any change, such as a fault or fold attracted attention at once. We could thus

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visit these exposures, first studying them as we approached, next hovering over them, and finally landing and examining the details. On taking off again it was possible to follow the faults for miles.

ADVANTAGES OF SURVEYING BY HELICOPTER

Indeed, without the helicopter, it would not have been possible to recognize several of the faults, still less to trace them for any distance, because they were often only traceable from a height by looking ahead. In this manner, by following a given fault it was easy to land at short intervals to examine the fault plane with care. Almost every exposure of the fault outcrops showed them to have become mineralized and to be in fact calcite veins. The ingrowing crystals had, in most cases, grown across the original cavities and entirely closed the fissure. There was no sign in any exposure of the calcite being stained by iron oxide, as a result of upward or downward percolating water. Some faults, or calcite veins, could be traced from the Wadi el Raiyan into the Faiyum near El Gharaq where a ridge of fine sandy gravel occurs on a line at right angles to the strike of the faults, and borings could be made on the ridge almost directly over the hidden faults, perhaps 20 to 25 feet under the alluvial debris. It was also possible to locate the line of a fault crossing under a canal and passing through the cutting of a drain.

(By Courtesy of the Egyptian Ministry of Public Works)

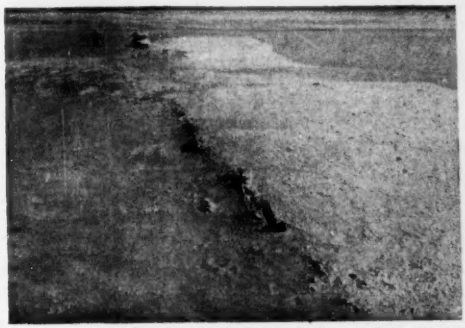
The Hiller Helicopter leaving the Bahariya Spring in the Wadi el Raiyan for El Gharaq

In such cases, by landing, it was easy to scrutinize exposures for seepage from the canal to the drain. Similarly, it was also remarkable how differences of shade enabled us to detect damp areas on the edges of sand dunes, or seepages at outcrops of impervious strata.

The fitting of photographic apparatus for vertical photographs from the helicopter is another, and in my opinion, most essential adjunct for geological work. The Sikorsky 51 or the Bristol 171 could be easily fitted up with photographic equipment for aerial surveys, and could also carry radioactivity detectors (field electroscope, α and β tube counters, scintillometer, etc.), magnetometers and gravimeters, in additon to a geologist, an assistant, and enough petrol for three hours' flying time. The vertical photographs taken from the helicopter at a sufficient height would yield accurate maps of great value, which would include topographical and geological features as they actually occur and are seen so clearly from the air. The instruments could be watched during flights, the readings being taken in a routine manner at different points on the ground and wherever any marked variation was detected the helicopter could be slowed down to hover or land as the situation required.

MOBILE CARAVAN CAMP

The idea of working from a mobile operational-cum-living headquarters, after the fashion of Montgomery and Rommel in the Western Desert, came from H.E. Osman Moharram Pasha, Minister, Egyptian Public Works. He was convinced that this was the most efficient technique to employ for the task in hand and he insisted that I make the necessary arrangements to secure two caravans and a



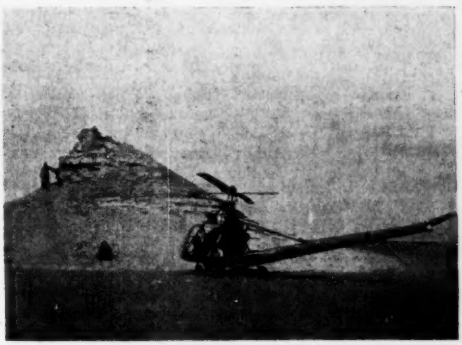
(By Courtesy of the Egyptian Ministry of Public Works)

A view northward along the outcrop of the Dead Man's Fault. The rock is seen in the distance

powerful towing vehicle equipped for desert work and for travelling across soft sand. Subsequently, these arrangements were finalized and the Egyptian Government purchased for my mobile camp two Coventry Steel Caravans and one 84 h.p. Matador, as a towing vehicle.

The two Coventry Steel Caravans were specially adapted to cope with the climatic conditions and the nature of the work involved. Each caravan was electrically air conditioned, supplied with a refrigerator operating from butane gas, and fitted with a large water tank; another large water tank was available for sliding into the Matador when that vehicle was used as a supply lorry. Each caravan was planned as a self-sufficient unit, and contained a dining room-cum-office, bed-sitting room, lavatory, bath and kitchen. Cooking and lighting could be carried out by using either electricity or gas.

The body of each caravan was strong but light, the exterior skin being constructed from a patent light alloy "H"



(By Courtesy of the Egyptian Ministry of Public Works)

Calcite Vein Hill. This hillock was first seen from the helicopter and lies about three kilometres east of Dead Man's Rock

section backed by a fibre insulation board with adequate window space to provide both ventilation and insulation. The chassis was carried on a single axle with extra-large wheels on each of the two wheels, one on each side. This arrangement was used in preference to that of using two

axles, and four wheels with two wheels, one following the other on each side, as it was thought that with the latter arrangement the probability of sticking in soft sand would be greater.

The Matador, which is manufactured by A.E.C. Ltd., —familiarly known as the makers of London's buses—was fitted with three bunks and carried tables and chairs for its own personnel. It also carried slides on which the Diesel oil electric generating sets for each of the caravans could be placed when the caravans were in tow. At camp these generators could be slipped off and placed under or near the caravan which each served.

Radio telephones were to be fitted in the helicopter, in one of the caravans and in the Matador so that intercommunication could be maintained between each unit during survey work, and while the Matador was away from camp. It was planned to have a 50 mile range for the radio telephone communication and to adopt a wave band which would not interfere with the civil and military radio. Thus camp could be moved to any spot directed by the helicopter, or the Matador could bring tools and personnel to prospect at any given point, which could be indicated by the helicopter hovering over it. This practical scheme could be easily extended to include some electrical resistivity or seismological equipment on the Matador to carry out, if required, a more extensive geophysical examination.

FINANCING LARGE SCALE AERIAL SURVEYS

From what has been stated, as within the limits of the helicopter as a new mode of transport for the most modern kind of geological survey and mineral exploration, it may be computed how complete and how rapid this kind of organized investigation can be. With the attendant Matador, the range from a central caravan camp could be at a radius of 100 miles. This range could include almost any country except the most mountainous or entirely forest-covered regions.

It is expensive for small areas, but it gives the geologist and the prospector an immense range. Two helicopters of the Sikorsky 51 or Bristol 171 types, with all spares, might cost £65,000 to £75,000. Two pilots and two ground engineers, with subordinate staff, might be estimated at £1,000 a month (on a year's basis) and the fuel, etc., would depend on the flying hours averaged for the month or year. With caravans, Matador, and scientific equipment (excluding any elaborate seismic or electrical resistivity methods), the initial capital outlay can be estimated at around £100,000. The cost of the geological and prospecting staff might raise the monthly expenditure on personnel to £2,000 per month. The maintenance, cost for the vehicles, equipment, chemicals and fuel supply, is difficult to compute, but it should work out at a reasonable figure when spread over twelve months.

With a capital outlay of between £100,000 and £125,000, an annual budget grant of £24,000 to £25,000 for salaries, and, at a rough computation of £15,000 a year for fuel, consumable stores and small replacements, there could be assembled a survey and prospecting unit of the most modern type—capable of elaborate and detailed investigations of large areas at great speed. I should estimate surveys of at least 12,000 square miles a month, or, say 60,000 square miles each field season. Egypt proper, including the Libyan Desert, the region from the Nile Valley to the Red Sea and the Sinai Peninsula, could be thoroughly explored within seven years. The cultivated and settled areas of Egypt—Nile Valley, the Delta, the Faiyum and the Oases—could be surveyed within a single season.

Subsequently, or as desired, the geological surveys and mineral exploration could be extended up the Nile Valley, through the Sudan, and into Abyssinia on the one hand, and into Uganda on the other. These extended investigations should not require more than another seven years. Thus, for a capital outlay of £150,000 and an annual expenditure of £40,000, say, a total of roughly £500,000 the whole of Egypt proper could be fully examined, geologically, for mineral occurrences and for engineering purposes, within seven years. It is most unlikely that any structural detail or mineral outcrop would escape observation by the geologist, or the camera operated from the helicopters.

REVIEWS

Mining Subsidence. Effects on Small Houses.—*National Building Studies Special Report No.* 12. *Published for the Ministry of Works by H.M.S.O. Pp.* 25, *Figs.* 12. *Price* 1*s.* 9*d.* (*net*).

This new Report is the work of an Inter-Departmental Committee (Chairman, Mr. H. A. Whitaker), convened by the Ministry of Works to investigate methods of preventing or minimizing damage caused by surface subsidence to houses in mining areas and since it contains much techical information which is not readily accessible elsewhere, it will be of considerable value to local authorities, architects, mining engineers and others working in areas where subterranean excavation is causing settlement and surface disturbance.

The Report considers subsidence in coal mining areas only, and investigation was limited to the effects on small houses. A preliminary survey was made of 34 coal mining areas, and ten of these were studied in detail. Advice on certain aspects was given by the N.C.B.

Working methods which give rise to mining subsidence are briefly described as well as the nature of various subsidences and surface movements and the authors state that complete protection of houses against damage by all movements due to subsidence is generally impracticable and uneconomic. Nevertheless, houses can be made more resistant to mining movements by making a number of simple changes in normal design without incurring a large increase in cost.

The Report recommends precautions to be taken in the layout and construction of houses. For example, they should be sited so that the shorter axis coincides with the direction of anticipated maximum curvature of the ground. A structure of simple box form, designed to act as a unit, is best; the smaller the plan of the building the less likelihood there is of damage. Semi-detached houses are preferable to terrace houses, detached are preferable to semi-detached. A bungalow is more likely to be damaged than a detached two-storey house with the same total floor area.

The provision of a reinforced concrete base slab, combined with the other recommendations made, will prevent any appreciable damage except where large differential vertical movements occur. The weakest mortar, consistent with the normal load-carrying requirements, should be used. Resistance of walls to flexure may be increased by the introduction of steel reinforcement in the brickwork, but the cost is justifiable only in houses certain to be subjected to severe differential vertical movements, such as those near the boundaries of mine workings.

A typical pair of semi-detached houses of traditional construction are illustrated, comparative plans and elevation being given to show modifications to make the building more suitable for mining areas. The principal alteration is the substitution of a reinforced concrete base slab for the normal strip footings. Three schemes are worked out to show the basis of design of the reinforcement. It was estimated at the time of the investigation that the additional cost per house, for the reinforced base slab over that of the normal footings, ranges from £13 to £20, with a further £5 for modifications to drainage and to the spine wall.

The Iron Ores of Sweden

Importance of the Kiruna Deposits

The following facts and figures relating to the development and importance of the famous Swedish iron ore deposits, notably in Lapland and in Central Sweden, are based on a series of articles which appeared in *The Anglo-Swedish Review*, to whom acknowledgment is made for permission to reproduce two illustrations.

Iron was being manufactured in Sweden six centuries B.C., and during the Viking Era "osmund iron," produced in small blast-furnaces from bog ore, played an important part in trade. However, it was not until after the working of ores was begun during the Middle Ages that the mining and iron-making industry started on a major scale. In the later 17th and during the 18th century, it attained a dominant position on the world market. Since the middle of the 18th century, when Sweden satisfied 35-40 per cent of world demand for iron, her industry has doubled its capacity many times over.

After impoverishing wars, interest turned to the more remote parts of Sweden, from the colonization of which an economic revival was anticipated, mainly in mining.

Kiruna, one of the most remarkable ore deposits in the world remained for nearly 200 years practically unheeded until it was opened up at the turn of the last century, to develop within a couple of decades into one of the most important mining enterprises of our time.

In 1736, when the share of the Swedish iron industry in world production was at its peak, a Government Commission visited Malmberget and Kiruna, "these two gigantic mountains of ore in the most desolate and inhospitable wilderness," and some idea was gained of the dimensions and composition of the deposits, but their high phosphorus made them almost valueless, according to the opinion held at the time.

DRAMATIC CHANGE THROUGH THOMAS AND GILCHRIST METHOD

In 1880, ore exports from Sweden did not exceed 20,000 tons—less than is now produced at Kiruna in a day. At this juncture, however, a dramatic change in the situation was brought about by Thomas and Gilchrist, who devised a method whereby phosphorus is removed from iron by means of the Bessemer converter. This "basic process" transformed Swedish phosphoric ore into a commodity greatly in demand and the first exports of Thomas ore took place from Grängesberg, already connected by railway with Oxelösund.

Thanks to the Thomas method, mining soon became considerable. In 1896, Trafik A.B. Grängesberg-Oxelösund was founded, gathering into one hand most of the mines and also the ore railways to the shipping port. In 1903, the company acquired the Lapland mines.

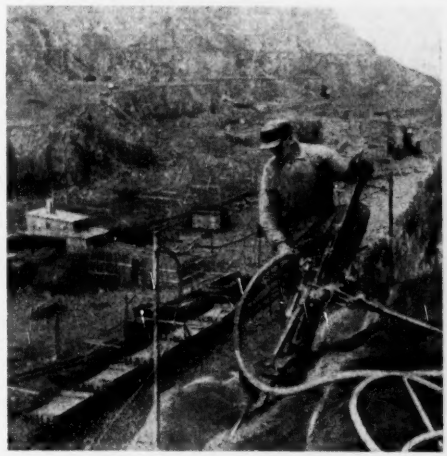
By the time this group was finally formed the State had just completed the Riksgränsen Railway, one of the most resolute thrusts of material civilization toward the Arctic regions. In 1888, the first cargo of ore had been shipped from Luleå. The stretch to Narvik was completed in 1902 and in January, 1903, the first ore ship sailed from Narvik. The ore fields now had access to ports both on the Gulf of Bothnia and on the Atlantic, and thus the necessary conditions were created for the export of ore on a large scale.

LARGE RESERVES

The Kiruna orefield is estimated to have contained 1,600,000,000 tons (down to 1,000 metres) of which about one-tenth has already been extracted. The Malmberget (Gällivare) deposit is put at 400,000,000 tons, of which 70,000,000 have been mined. The rest of Lapland is roughly assessed at 600,000,000 tons, but only 15,000,000 tons have so far been taken out.

Of the Central Swedish reserves of 378,000,000 tons (171,000,000 already mined), Grängesberg accounts for 150,000,000 (less 51,000,000 already extracted). The assumed depths of the deposits vary from 1,000 metres at Kiruna to an average of 350 metres for the smaller Central Swedish fields. In all, it is estimated that Sweden still has reserves totalling 2,564,000,000 tons, compared with an original 2,978,000,000.

The estimated total production of Swedish iron ore during the period prior to 1900 amounted to about 53,000,000 tons, of which 6,000,000 from Malmberget, and none from Kiruna. Since then, 361,000,000 tons were mined up to and including 1949. This comprised 158,000,000 from Kiruna, 63,000,000 from Malmberget (Gällivare), 45,000,000 from Grängesberg and 95,000,000 from other deposits.



Tidying up the rock face with a pneumatic drill at Kirunavaara. Notice waste-rock waggons and blast-proof shelter and two mechanical shovels in background

On the whole, the trend of annual production has been strikingly uneven, the mining industry being highly sensitive to changing market conditions. Pronounced setbacks in production were caused by the big strike in 1909; the crisis after the first world war; the strike in 1928; the depression at the beginning of the 1930's, and the second world war, from the effects of which a recovery has been made during the past few years.

EXPORTS

During the period 1900-1949, Sweden's ore exports represented no less than 87 per cent of production. Of total exports of 313,000,000 tons, the Grängesberg group exported 253,000,000 tons and other mines 60,000,000 tons. Ore exports reached their peak in the years immediately preceding the last war, totalling 14,000,000 tons in 1937, valued at 213,000,000 kronor. In fact, after forest products, iron ore is Sweden's most important export commodity. However, ore exports are sensitive in a high degree to market variations. In a boom, rich ore

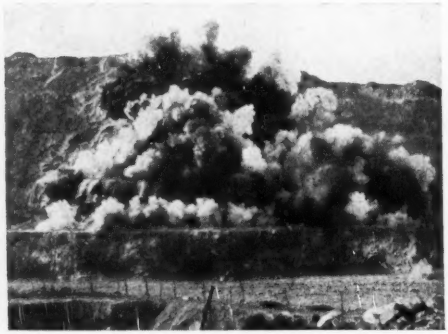
increases the capacity of smelting works; in a depression it can be dispensed with even though relatively cheap. It is then an urgent consideration to save foreign exchange, avoid unemployment in domestic mines and yet to keep furnaces in blast even if the burdens are poor and efficiency low, because furnace gas is still required for industrial and municipal consumers, usually on long-term contracts.

On the ore that remains in the country (48,000,000 tons in the period 1900-1949) the celebrated Swedish iron and steel industry and—indirectly—the engineering industry are based.

THE RISE OF KIRUNA

The Kiruna mining settlement—90 miles north of the Arctic circle—faces Lake Luossajarvi at the foot of the conical ore mountain of Luossavara, upon which the open cut workings are visible as a furrow at the top. Just across the lake rises the huge ridge of Mount Kirunavara, now after 50 years of mining operations demolished beyond recognition and embedded in broad terraces of waste rock. The highest peak of the ridge, known as "Statsrådet," originally rose 2,454 ft. above sea level, while Luossavara, whose summit remains, is 66 ft. lower.

Although in the wilds of Lapland, Kiruna is favourably situated for transport. The Atlantic port of Narvik (ice-free all the year) is only 100 miles away by rail, and Luleå 190 miles.



Kirunavaara—Blasting on several slopes simultaneously

Fifty years ago there was no settlement here; now the mining community alone consists of 12,000, of whom 7,000 are directly connected with the mines as employees or members of their families. The miners' wages are more than 50 per cent above the average for industrial workers in Sweden.

A town plan was drawn up in the very early stages, thus obviating the usual "shanty" phase in a new settlement. Every effort has been made to create the best possible housing conditions. The Mining Company, Luossavaara-Kirunavaara A.B. (LKAB) has about 950 flats for its employees. The more modern workers' dwellings mostly consists of 2-3 rooms, bathroom and kitchen. Home ownership has been encouraged. About 300 of the company's staff own their homes. There are assembly rooms, baths, an open-air swimming pool, a sports ground and schools. Occupational training has always been an ideal in Kiruna; LKAB started training of this kind in 1910, and these technical schools subsequently became a prototype for occupational instruction in Sweden.

The Kiruna ore occurs along a stretch of 7 kilometres as a series of steeply sloping slabs sandwiched between two beds of porphyry. The main ore body, which originally lay exposed along the crest of the Kirunavara ridge, continues as two lenses, one running south and the other north under Luossajärvi, to reappear 1 kilometre further north as an isolated body at the top of Luossavara. Another deposit which runs parallel to the latter is the Rektor ore, interesting because of its extremely high phosphorus content.

The main Kiruna deposit alone is 5 kilometres long and up to 200 metres broad (average 100 metres) and has an ore area of about 436,000 sq. metres. Luossavara and Rektor bring the total to nearly 500,000 sq. metres. Every vertical metre should thus yield about 2,000,000 tons.

Drillings give an estimate of 1,600,000,000 tons of ore down to 730 metres below the level of Lake Luossajärvi. Of this, 158,000,000 tons have been mined so far. If mining proceeded at the present annual rate of 6,500,000 tons, it would be possible to work the deposit for at least a further 200 years.

Technically, there is nothing to prevent ore being mined at much lower levels. The objection that costs would then be prohibitive carries no weight, as the technique employed is being constantly improved; moreover, other rich and well-situated deposits will by then have been worked out, so that iron ore will have increased in value.

COMPOSITION OF KIRUNA ORE

Kiruna ore consists of magnetite with an unusually low interspersion of sterile—5-8 per cent if we disregard apatite, which is itself of value as raw phosphate. Typical of Kiruna ore is its generally high phosphorus content; the predominant type, KD, contains an average of 2 per cent phosphorus. This corresponds to 11 per cent apatite, which even in KD is visible to the naked eye as an intermixture of greyish grains. In exceptional cases, the phosphorus amounts to 3-4 per cent and in Rektor 4½ per cent. No other rich iron ore deposits so far known have such a high phosphorus content as Kiruna. In comparison, the Thomas ores at Malmberget and Grängesberg contain barely 1 per cent phosphorus, with 60 per cent iron.

In the Kiruna mine, qualities with all grades of phosphorus are found, from KD with 2 per cent and 60 per cent iron to types poorer in phosphorus, through the C grades to B and A, all having progressively higher iron, A grade with about 68 per cent and 0.02-0.03 per cent phosphorus—only one-hundredth of that in KD.

Rektor ore is in a class by itself, with 4-5 per cent phosphorous and only 30-40 per cent iron, and with a far higher interspersion of sterile. Although at times there has been some demand for it as an addition to a Thomas charge in which high phosphorus has been required, a more important use has been found for it in the home production of fertilizer, especially during the war. However, Rektor is not worked at present, but is being re-opened.

At Luossavara, low phosphoric ores predominate, as at the northern end of the big Kiruna deposit. To meet the heavy demand for ores rich in iron and low in phosphorus, for use as sweeteners in open-hearth steelworks, these grades of ore have at times been worked more rapidly than the mine as a whole, some even being extracted from underground workings opened up in advance at lower levels.

Even rich ores ore generally admixed with leaner mineral and barren rock, so that they have to be crushed and separated, and the low grade ore concentrated. (This applies to some extent at Malmberget and Grängesberg.) At Kiruna, however, practically all the ore is won direct as lumpy high-grade ore. A concentrating plant is therefore unnecessary, but there are small sorting plants for Luossavara and the Rektor mine, and one at Kirunavara for ore that has become contaminated with wall rock.

(To be concluded)

Machinery & Equipment

The Meader Pump

The Meader Pump is claimed to represent a significant advance in the technique of handling thick sludges and semi-solids because many materials, the pumping of which has hitherto been regarded as impossible, can now be handled with ease. This pump is capable of handling clays or mud of such low moisture content that the angle of repose of the material is of the order of 90°. The hopper is of a type suitable for feeding by hand or by grab, but it could be fitted direct to the point of production of the material, e.g., the outlet from a filter press, or the base of a thickening tank, or coal washer. It would then form a closed circuit from the point of origin to the final disposal point, which may be a few miles away.

Tests of the Meader Pump have demonstrated that it is suitable for handling thick, semi-solid substances, such as various muds, clays, residues from many chemical processes, cement slurries, fireclays, esturine silts, ceramic compositions, pastes, etc., and, generally, all materials which are in a plastic state at normal temperatures.

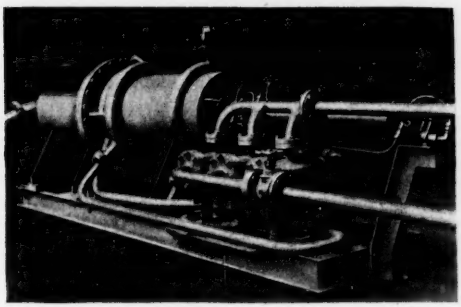
Operation is by hydraulic power obtained from a multi-stage centrifugal pump. The operating medium could also be either steam or compressed air, or by direct mechanical drive.

Tests have shown that remarkably little effort is required for operating this pump. For example, less than 100 lb. per sq. in. water pressure was required for pumping the material, shown in the illustration below, through 200 ft. of 5 in. diameter piping. The hydraulic power was supplied by a three-stage centrifugal pump driven by a 15 h.p. motor operating at about ¾ full load.

It is claimed that maintenance costs will be very low as all moving parts operate comparatively slowly; also there are no valves or glands in contact with the material being pumped.

The range of capacities of Meader pumps at present under consideration is from five tons per hour to 100 tons per hour. Should greater capacities be required a suitable type could be designed. The pump and valve gear are of welded construction throughout and therefore can be made to suit any pressures that may be required.

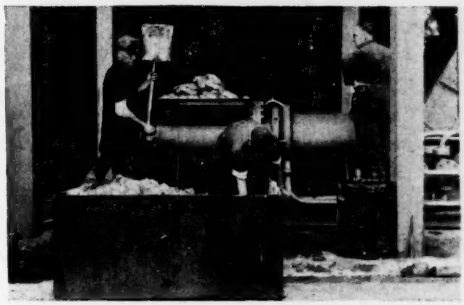
Among advantages claimed for the Meader pump is its extreme flexibility. The speed (and therefore the output)



The Meader Pump manufactured by Henry Balfour & Co., Ltd.

is capable of infinite variation betwen zero and maximum merely by the adjustment of the pressure fluid inlet valve. Another advantage is that the total quantity of material which has been pumped over a period can be determined by means of a simple counter which can be operated by direct contact with the disc. This feature applies only to those materials which will flow into the chamber freely enough to ensure that the cutting cylinder is completely filled at each stroke.

The pump can be used as a form of conveyor for any material which is capable of being extruded at normal



Feeding the Meader Pump

temperatures. The discharge pipe can be led in any direction and is not confined to any one plane as is the case with the normal type of conveyor.

In addition to the more obvious uses of the Meader pump the following suggestions are made for its special uses:

Fines from colliery washeries could be pumped direct from the bottom of the washer to the dumping site; the disposal of existing colliery bings; pumping unset concrete, with an upward limit of say 4 in. aggregate, to any desired position on a building or civil engineering works; withdrawal of thickened material from the bases of thickening tanks; the feeding of slurries, pastes or granular materials into rotary kilns; handling of soft materials encountered when tunnelling; and pumping of heavy oils, thick residues from oil refineries, and pumping residues from all types of factories.
all types of factories.

The inventor and patentee of the pump is Mr. C. W. Meader, A.M.I.Mech.E., M.I.Mar.E., of Burntisland, Fife. The sole manufacturing rights of the pump for the United Kingdom have been acquired by Messrs. Henry Balfour & Co. Ltd., Durie Foundry, Leven, Fife, to whom all enquiries should be addressed.

The Fowler Challenger I Diesel Crawler Tractor

The Fowler Challenger I Diesel Crawler Tractor, made by John Fowler & Co. (Leeds), Ltd., Hunslet, Leeds, 10, which will be exhibited for the first time at the forthcoming Smithfield Show, is fitted with the Marshall E.D.5 two cylinder loop scavenge two-stroke engine, developing 50 b.h.p.—an engine of simple and robust construction, which has been specially developed for tractor duty.

The Challenger I is described as the result of several years development and prototype testing and will be produced in limited quantities during 1952. While primarily intended for the agricultural market, it is also suitable for industrial work and a full range of ancillary equipment will be available.

Some provisional specifications are: Speeds (in m.p.h.), forward: First, 1.68; Second, 2.25; Third, 3.11; Fourth, 3.86; Fifth, 5.2; and Sixth, 7.2 Reverse: 1.27 and 2.96.

Metals, Minerals and Alloys

Widespread anxiety is expressed in the United States regarding forthcoming Union-Management wage negotiations in steel, which, if not satisfactorily settled would leave the Steelworkers' Union free to call strikes at the beginning of next year, and even if the Wage Stabilization Board imposed a settlement for the unexpired period of this year, individual stoppages might ensue. The effect of any major dislocation in the steel industry would of course react heavily on the base metals. Already many smaller consumers are reported to be preparing to suspend operations as a result of curtailment of supplies especially of copper, lead and zinc.

Copper.—Immediate interest in the United States is now centred on whether the domestic ceiling price will be raised to 27½c. so as to unify import and domestic prices, as has been done in the case of lead and zinc.

U.K. stocks at the end of August are given by the British Bureau of Non-Ferrous Metal Statistics as 126,653 tons against 122,910 tons a month earlier. Consumption for the month in terms of metal was 36,248 tons.

The Board of Trade has issued amendment orders extending the prohibited uses of copper and zinc in 30 additional domestic articles. Exports of copper and brass products from Japan are increasing with keen demand from West Germany, Holland and Brazil. It is reported from Santiago that West Germany is to buy the whole production of the Chilean national smelter at Paipote at 57c. per lb. In our issue of June 15 it was reported that this plant would have a treatment capacity of 110,000 tons of material

Lead.—The U.K. has made an additional purchase of 6,000 tons of Mexican lead at 21½c. f.a.s. Gulf Ports, raising the quantity purchased for shipment in the first quarter of next year to some 20,000 tons. Following a fresh agreement, Canada has resumed offerings to the U.S. at 19½c. plus import duty of 1 7/16c., delivered. The plans for increasing production in the Córdoba, Cartagena and Mazarrón fields of Spain are now coming into effect, and the estimate of a production this year of 48,000 tonnes is expected to be realized.

U.S. consumers have been allocated about one-third of their applications for October with little prospect of any assistance by way of imports. These amounted to 91,990 s.tons in the first seven months of the year, against 238,423 s.tons in the same period of 1950. The A.S. and R., the chief Mexican producer, will maintain the price of 21½c. per lb. ex-Mexican refinery.

The U.K. Minister of Supply has reduced the price of remelted and scrap lead by £5 per ton to £160, to conform with the recent reduction in virgin metal. U.K. stocks at the end of August showed a good gain at 43,959 tons compared with 27,959 tons a month earlier.

Tin.—The R.F.C.-Bolivian negotiations for a new contract seem at present to be in the fencing stage. The Americans are reported to have intimated that they will sign a long-term contract only at a price considerably less than 150c. per lb., which Mr. Walsh has characterized as "fabulous," and object to costs being based upon the higher cost mines; they want a weighted average as between high and low cost producers. The R.F.C. officials say that the producers' taxes to the Bolivian Government have increased more than all other costs—labour, materials and overheads—combined, to which the Bolivians reply that their country's economy is solely dependent on income obtained on production of tin and point out that U.S. returning charges have been raised from 10c. to 32c. per lb. Of course until the Bolivian contract is settled it is difficult to see how any fresh contract with other countries, such as Indonesia and Belgium can be negotiated. Mr. Stuart Symington told a Press Conference in Washington on Tuesday that U.S. supplies were good and that America was ready for a long struggle to get tin at what she considered a reasonable price.

Straits shipments in September were 6,375 tons (6,176 tons in August). The distribution was: Europe, 3,267 tons; British possessions, 1,482 tons; U.K., 1,057 tons; other countries, 569 tons.

The difficulties facing the Tableland Tin Dredging Co., over pollution, have been accentuated by a fire said to have done damage to the extent of £70,000, including ore bags, workshops reserve stores and machinery, and this will further affect the existing tin shortage in the Commonwealth.

The Indonesian output in September was 2,663 tons, making the total for the first nine months 22,733 tons against 23,857 tons for the same period last year.

Zinc.—The ceiling on import prices continues the chief preoccupation of producers and consumers in the U.S. Meanwhile, the Eagle Pitcher Mining & Smelting Co. has advanced its price for 60 per cent concentrate to the basis of $137½ per s.ton, compared with a former price of $115. This big advance is probably largely due to the outcome of the recent strikes.

September production of slab zinc in the U.S. was reduced by the strike to 70,623 s.tons (74,035 in August). Shipments from smelters, however, were more seriously curtailed being nearly 10,000 s.tons less at 64,632 s.tons of which, 3,414 went to Government account. As a result stocks increased during the month from 11,244 to 17,235 s.tons.

U.K. stocks of zinc at the end of August were 46,521 tons compared with 42,686 tons a month earlier. Consumption during the month was 19,249 tons and for the eight months of the year 184,661 tons (213,684 tons a year ago).

As the result of the advance in U.S. domestic price, French consumers now have to pay Frs.16 per kilo extra, with virgin metal selling at Frs.181 per kilo.

Aluminium.—Heavy rains have enabled the Bonneville Power Administration to resume full supplies of power to the aluminium industry in the Pacific North-West, at least temporarily. The Kaiser Aluminum & Chemical Co. is reported to be planning a $50,000,000 expansion in its Newark plant, and has applied for priority in materials.

Magnesium.—We regret that the figures given in our issue of September 28 for U.K. imports of magnesite to the end of August should have read 17,233 tons. The figure given of 38,425 was the value, and not the tonnage.

Nickel and Cobalt.—The International Materials Conference has announced an allocation of 31,153.8 tonnes of nickel and 2,049.6 tonnes of cobalt to 32 countries for the 4th quarter of 1951. The chief allocations are: U.S. 19,690 tonnes nickel and 1,214.4 tonnes cobalt; U.K., 5,089 tonnes nickel and 329.1 tonnes cobalt; France, 1,461 tonnes and 75 tonnes respectively; Germany, 1.425 and 127.5; Canada, 750 and 29.3; Sweden, 736 and 42.2; Japan, 485 and 60.4; India, 245 and 14.1; Italy, 265 and 14.5; Austria, 225 and 20; Australia, 197 and 13.3; Switzerland, 113.5 and 1.9; Belgium, 108.5 and 26. South Africa is allotted only 16 and 5.2 tonnes. All Governments may appeal against their allocations within one month.

Tungsten.—Discussions are still taking place in Washington regarding the last quarter allocation arrangements. A decision is expected some time this week; officially it is hoped that agreement will be achieved. Meanwhile there is no change to report in the general situation and the control price remains unchanged at 525s. and 535s. per unit for purchases and sales respectively.

Uranium.—Further finds of uranium ore reported from Central Colorado are regarded as significant as indicators warranting further search of the district. Two uranium fields are said to have been found in Coquimbo and Atacama, provinces of Chile.

Gold.—The production of Western Australia in August was 51,495 f.oz. Colombian production in June was 36,132 f.oz., making the total for the half year 219,972 f.oz., compared with 192,897 f.oz. a year ago. The increase is chiefly from the dredges. A statement on the International Monetary Fund's policy in regard to its members appears in another column.

Silver.—The price of silver was cut in New York to 84.75c. per f.oz. from 90.16c. on October 4, but has since been raised to 88c. The reduction is attributed to the failure of the pre-Christmas demand from silverware manufacturers to develop.

The London Metal Market

(From Our Metal Exchange Correspondent)

Except for an inexplicable fall in the Singapore market on Friday last which was quickly recovered, the market has continued to advance steadily with an increasing backwardation. The rising price can be attributed to a number of factors, the most important of which being the general fear of continued inflation, the feeling that the American Government will be forced to re-enter the market in the not too distant future. The fresh trouble with Egypt will be watched with the greatest of interest as should there be any interference with shipping from Malaya to the U.K. via the Suez Canal, the backwardation might be forced up to a very much higher figure.

In other metals the Ministry of Materials has apparently decided that its average cost price for lead and zinc are sufficiently low to enable it to maintain the previous selling prices in spite of the upward adjustment in the United States ceiling prices.

On Thursday the official close on the tin market was:—Settlement price £1.015, Cash Buyers £1,015, Sellers £1,020; Three months' Buyers £947 10s.: Sellers £952 10s. In the afternoon the market was steady. Turnover for the day was 225 tons. Approximate turnover for the week was 905 tons.

The Eastern price on Thursday morning was equivalent to £951 15s. per ton, c.i.f. Europe.

Iron and Steel

Reports from foreign markets indicate that the scramble for steel is not confined to this country. The shortage is world-wide in its incidence. Although U.S. steel production is running at a rate of well over 100,000,000 tons per annum, German steel is being shipped to America in exchange for coal, and the British authorities are endeavouring to buy steel from both U.S.A. and Germany.

The British Board of Trade has revoked a large number of bulk export licences for steel, German steel exports are to be reduced to a monthly quota of 90,000 tons, which represents a cut of 10 per cent, and advances in French steel prices have been authorized which range up to 22 per cent.

During the first half of the current year, European crude steel production was about 10 per cent greater than in the corresponding period of 1950 but this expansion has been halted and thrown into reverse mainly because of the lack of coal. Thus the outlook for industrialists who require big tonnages of iron and steel for full scale employment is very bleak.

British foundries as well as the steel melting shops are badly in need of more pig iron and scrap. To some extent the supply of pig iron for steel production will be increased by the output of a big blast furnace which has just been blown in at Scunthorpe after re-lining. But this will not help the foundrymen who are clamouring for more haematite, low medium and high phosphorous, and refined irons. All these grades are in short supply and stocks are dwindling.

Nor is there much improvement in the scrap position, most of the extra material collected as a result of the home scrap drive consisting of the lighter, bulkier grades which are not of much use for steel making. What the steel makers need is more heavy mild steel scrap and it is the heavy grade of cast iron which is wanted for foundry use.

Re-rollers are still operating under difficulties occasioned by the scarcity of prime billets, blooms, slabs and sheet bars. Imported material is very costly but even at the high prices quoted by European exporters more material would be purchased if it were obtainable.

The dearth of sheet steel is creating serious difficulties in the motor industry and there appears to be no prospect of early relief. Wire mills and rollers of light sections and bars are also quite incapable of coping with the swollen demand for these products.

OCTOBER 11 PRICES

COPPER

Electrolytic	£227 0 0 d/d

TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

LEAD

Soft foreign, duty paid	£175 0 0 d/d
Soft empire, including secondary lead ...	£175 0 0 d/d
English lead	£176 10 0 d/d

ZINC

G.O.B. spelter, foreign, duty paid ...	£190 0 0 d/d
G.O.B. spelter, domestic	£190 0 0 d/d
Electrolytic and refined zinc	£194 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over	£390 per ton
Crude (70%)	£305 per ton

NICKEL

99.5% (home trade)... ...	£454 per ton

OTHER METALS

Aluminium, £124 per ton.	Platinum (scrap), £33.
Bismuth, 28s. lb.	Platinum, £27/£33 5s. nom.
Cadmium, 18s. 9d. lb.	Rhodium, £45 oz.
Chromium, 6s. 3d. lb.	Ruthenium, £30 oz.
Cobalt, 17s. 6d. lb.	Quicksilver, £73 10s./£74 ex-warehouse.
Gold, 248s. f.oz.	Selenium, 25s. nom. per lb.
Iridium, £65 oz. nom.	Silver (bar), 77d. f.oz. spot and forward.
Magnesium, 1s. 6d. - 2s. lb. according to quantity.	Tellurium, 19s. lb.
Osmiridium, £35 oz. nom.	
Osmium, £70 oz. nom.	
Palladium, £8 10s. oz.	

ORES, ALLOYS, ETC.

Bismuth	50% 16s. lb. c.i.f. 40% 14s. 9d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£13 per ton c.i.f.
,, ,, (concentrates)	£13 per ton c.i.f.
,, ,, Refractory	£12 12s. per ton c.i.f.
Baluchistan Metallurgical ...	£13 18s. 6d. per ton c.i.f.
Magnesite, ground calcined...	£26 - £27 d/d
Magnesite, Raw	£10 - £11 d/d
Manganese, Best Indian ...	(Nominal)
Molybdenite (85% basis) ...	103s. 1½d. per unit c.i.f.
Wolfram (65%), U.K. ...	525s. nom. c.i.f.
Tungsten Metal Powder (for steel manufacture) ...	35s. nom. per lb. (home)
Ferro-tungsten	33s. nom. per lb. (home)
Carbide, 4-cwt. lots	£30 3s. 9d. d/d per ton
Ferro-manganese, home ...	£40 8s. 9d. per ton
Ferro-manganese, export ...	Nom.
Brass Wire	2s. 7½d. per lb. basis.
Brass Tubes, solid drawn ...	2s. 1d. per lb. basis.

The Mining Markets

(By Our Stock Exchange Correspondent)

In ordinary circumstances the spate of bad news this week would have turned business flat. Abroad, the crisis in Egypt follows the debacle in Abadan and the whole structure of British power in the Middle East appears to be rocking on its foundation. In market circles there is no confidence in the Cabinet's handling of this situation. At home, a speech made by the Chancellor of the Exchequer revealed a most serious fall in our gold and dollar reserves. Buoyant conditions, however, have been the order of the day. These can only be attributed to hopes of a change of Government. It is interesting to note that these expectations are evidently also shared abroad. Persia and Egypt have apparently "cashed in quick," and foreign buying of gilt-edged stocks is reported from the market.

The Canadian Government have declared their policy following last week's change in I.M.F. rules. Gold producers will be allowed to sell gold in the free markets of the world, provided they receive payment in American dollars. Any company which decides to take this action, however, will not be eligible for assistance under the Emergency Gold Mining Assistance Act. The help which Yukon Gold Corporation received in 1950 was estimated at about 2 per cent of total sales. If the free market gold should retain its present price the bonus element would work out at around 13 per cent. This would make a striking difference in the fortunes of the Corporation. But it remains to be seen whether the price of free gold will hold up, especially since such countries as Australia, West Africa and Southern Rhodesia appear likely to follow the lead. Yukons which at one time rose to 5s. 9d. finished the week easier at 5s. 4½d.

West African shares were a firmer market on these hopes. The news that Amalgamated Banket had made a profit of £27,934 for September against £6,614 for August was well received. Last year's reorganization and amalgamation of the company may well be beginning to make itself felt. The joint Lyndhurst and Konongo development results foreshadowed last week were announced. Of 215 ft. sampled on No. 5 level Boabedroo 65 ft. was payable giving 26.7 dwt. over 47 in. Of 160 ft. of rising and winzing sampled only 60 ft. of ¼ South Rise Boabedroo was payable giving 21.4 dwt. over an average width of 40 in.

The strength of tin shares in both the Eastern and Nigerian sections is attributable to the rising price of the metal which this week crossed the £1,000 per ton mark for spot. This improvement followed rumours that the Bolivians were demanding a price of £1,200 per ton. Malayan exports for September reached 6,375 l.tons, an increase of 199 tons on August. The assassination of the High Commissioner has once again served as a grim reminder of the intensity of Communist activity in the country. It is thought in London that miners and planters are likely to make strong representations for more troops and a stronger action policy.

Orange Free State shares were again patchy, and the September quarterly report from St. Helena was definitely disappointing. Basal reef payability is given as 27 per cent with an average value of 11.3 dwt. over 21 in. equivalent to 237 in. dwt. While operations may well have commenced in a relatively poor section of the property, the technical position will obviously require careful watching. First milling returns are anticipated next month. Welkom results are expected shortly.

The recent demand for diamond shares appears to have been fully justified. Sales for the first nine months of 1951 total £49,500,000 only £1,200,000 less than last year's record total for twelve months. American stockpiling of industrial stones has been particularly heavy.

	Price Oct. 10	+ or − on week
FINANCE		
African & European	3⅜	+⅛
Anglo American Corpn.	8⅞	+⅛
Anglo-French	23/1½	+1/3
Anglo Transvaal Consol.	38/9	.....
Camp Bird	13/4½	.....
Central Mining (£1 shrs.)	47/6	+1/-
Consolidated Goldfields	52/6	+7½d
Consol. Mines Selection	34/4½	+7½d
East Rand Consols	4/4½	−1½d
General Mining	6⅜	−⅛
H.E. Prop	37/6	+1/3
Henderson's Transvaal	11/3	+3d
Johnnies	3½	.....
Rand Mines	7	+⅛
Rand Selection	45/-	+1/10½
Union Corporation	10⅜	−⅛
Vereeniging Estates	5⅛	.....
Writs	31/-	+4½d
West Wits	45/-	.....
RAND GOLD		
Blyvoors	51/9	+9d
Brakpan	20/3	+3d
City Deep	2⅝	−⅛
Consol. Main Reef	2⅛	+⅛
Crown	4⅜	.....
Daggas	3⅛	+⅛
Dominion Reefs	1/7½	.....
Doornfontein	25/-	.....
Durban Deep	3⅜	+⅛
E. Daggas (4/- units)	26/10½	.....
E. Geduld	53/9	.....
E. Rand Props	4½	+⅛
Geduld	7⅜	+⅛
Grootvlei	38/9	+1/3
Libanon	16/-	−3d
Luipaards Vlei	22/-	−3d
Marievale	22/6	+9d
Modderfontein II	5/-	.....
Modderfontein East	37/6	.....
New Kleinfontein	32/6	.....
New Pioneer	21/3	.....
Randfontein	19/-	+3d
Robinson Deep	15/-	+6d
Rose Deep	37/6	+1/3
Simmer & Jack	6/9	.....
Springs	10/-	+1½d
Sub Nigel	3⅛	+⅛
Van Dyk	14/9	−3d
Venterspost	29/6	+9d
Vlakfontein	18/6	−3d
Vogelstruisbult	28/9	+6d
West Driefontein	6⅞	+⅛
W. Rand Consolidated	46/10½	+1/10½
Western Reefs	42/6	+7½d
Q.F.S.		
Alpha F.S.A.	11/3	.....
Blinkpoort	22/6	.....
Central Mining F.S.	4/9	−3d
Freddies	12/3	+3d
Freddies N.	11/3	+3d
Freddies S.	12/9	.....
Geduld	3½	.....
Geoffries	26/-	−9d
Harmony	23/-	−1/6
Lydenburg Estates	10/7½	+1½d
Middle Wits	24/3	+3d
Ofsits	47/6	+1/3
President Brand	21/6	−3d
President Steyn	18/1½	+1½d
St. Helena	28/1½	−7½d
U.F.S.C. & G.	8/3	−6d
Virginia Deb.	76	.....
Virginia Ord.	13/-	.....
Welkom	38/9	+1/10½
Western Holdings	3⅜	+⅛
WEST AFRICAN GOLD		
Amalgamated Banket	2/4½	+3d
Ariston	7/4½	+3d
Ashanti	30/6XD	+9d
Bibiani	10/-XD	.....
Bremang	3/3	+1½d
G.C. Main Reef	3/10½	+4½d
G.C. Selection Trust	9/7½	+3d
Konongo	3/4½	+3d
Kwahu	5/6	+1/-
London & African Mng.	2/7½	.....
Lyndhurst Deep	1/9	+1½d
Marlu	2/1½	−1½d
Nanwa	7½d	+1½d
Taquah & Aboso	7/7½	+4½d
AUSTRALIAN GOLD		
Boddef Perseverance	3/1½	+1½d
Gold Mines of Kalgoorlie	15/3	+3d
Great Boulder Prop.	7/9	+6d
Great Western Consol.	3/9	+1/-
Lake View and Star	22/6	+1/1½
Mount Morgan	19/4½	+1/-
North Kalgurli	18/3	+3d
Paringa	10½d	.....
Sons of Gwalia	11/-	.....
South Kalgurli	8/6	.....
Western Mining	8/6	+9d
Wiluna	12/3	+3d
MISCELLANEOUS GOLD		
Cam and Motor	36/10½	+3/1½
Champion Reef	9/6	−1/-
Falcon Mines	10/9	+6d
Globe & Phoenix	24/6	+9d
MISCELLANEOUS GOLD (contd)		
G.F. Rhodesian	8/6	−3d
London & Rhodesian	5/7½	.....
Motapa	3/4½	+7½d
Mysore	5/4½	−7½d
New Guinea	1/9	.....
Nundydroog	6/7½	−7½d
Ooregum	2/10½	−4½d
Ranger	14/6	+4½d
St. John d'El Rey	41/3	+3d
Zams	40/6	+2/9
DIAMONDS		
Anglo American Inv.	5⅜	+⅛
Cams	42/9	+1/3
Cons. Diam. of S.W.A.	4⅜	.....
De Beers Defd. Bearer	73/3	+2/6
De Beers Pfd. Bearer	16⅜	.....
COPPER		
Chartered	73/1½	+2/-
Indian Copper	4/3	.....
Messina	6⅞	−⅛
Nchanga	7⅜	+⅛
Rhod. Anglo-American	68/9	+2/6
Rhodesian Selection	22/1½	+1/1½
Rhokana	24½	+1/-
Rio Tinto	24½	+1½
Roan Antelope	13/6	+4½d
Selection Trust	53/1½	+1/10½
Tanks	58/9	+4/3
Tharsis Sulphur Br.	52/6	.....
TIN (Eastern)		
Anglo-Burma	2/9	.....
Ayer Hitam	28/-	−3d
Bangrin	34/-	+1/-
Gopeng	15/9	+3d
Hongkong	11/3	+3d
Ipoh	32/-	+1/-
Kamunting	14/-XD	+1/-
Kepong Dredging	14/-	+3d
Kinta Tin Mines	18/-	+1/3
Kramat Pulai	4/3	.....
Malayan Dredging	24/-	−3d
Pahang	18/7½	+2/-
Pengkalen	11/6	+3d
Petaling	14/4½	+6d
Rambutan	17/6	.....
Siamese Tin	24/-	+1/3
Southern Kinta	14/9	+9d
S. Malayan	30/3	+1/9
S. Tronoh	28/3	+9d
Sungei Kinta	19/4½	+7½d
Tekka Taiping	9/9	+9d
Tronoh	31/3	+1/3
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	11/-	+1½d
Beralt Tin	27/3	+2/3
Bisichi	4/1½	+3d
British Tin Inv.	18/7½	+4½d
Ex-Lands Nigeria	7/3	.....
Geevor Tin	16/6	+7½d
Gold & Base Metal	5/-	+6d
Jantar Nigeria	7/4½	.....
Jos Tin Area	11/1½	.....
Kaduna Prospectors	4/-	.....
Kaduna Syndicate	6/-	−3d
London Tin	6/9	+3d
Ribon Valley	1/4½	.....
United Tin	3/4½	−1½d
SILVER, LEAD, ZINC		
Broken Hill South	60/9	+1/3
Burma Corporation	3/7½	.....
Consol. Zinc	36/-	+1/3
Lake George	27/9	+1/6
Mining Trust	7/9	.....
Mount Isa	50/3	+9d
New Broken Hill	30/-	+1/6
North Broken Hill	81/6	+3d
Rhodesian Broken Hill	22/9	+6d
San Francisco Mines	35/-	−1/3
Trepca	4/-	.....
MISCELLANEOUS BASE METALS & COAL		
Amal. Collieries of S.A.	60/-	.....
Associated Manganese	70/3	−1/-
Chinese Engineering	3/-	.....
C.P. Manganese	48/9	.....
Natal Navigation	5⅜	.....
Wankie	25/-	+1/3
Witbank Colliery	3⅜	.....
CANADIAN MINES		
Dome	$35	.....
Hudson Bay Mining	$117	.....
International Nickel	$89	+6½
Mining Corpn. of Canada	£7⅛	+⅛
Noranda	$156	+2
Quemont	£9⅛	.....
OIL		
Anglo-Iranian	5⅜	+⅛
Apex	49/4½	−7½d
Attock	24/4½	.....
Burmah	64/4½	+2/6
Canadian Eagle Bearer	38/-	+1/4½
Mexican Eagle	27/7½	+7½d
Shell	4⅜	+⅛
Trinidad Leasehold	33/-	+9d
T.P.D.	37/6XD	.....
Ultramar	34/6	+1/9

Company News & Views

Reactions to I.M.F. Decision

Reactions to the recent decision of the International Monetary Fund to permit member States to determine their own policies with regard to the sale of non-monetary gold at premium prices within the framework of the Fund's Articles of Agreement, can now be recorded.

Gold producers in Canada are to be allowed to sell gold in the free markets of the world, provided that they receive U.S. funds in exchange and also that they forgo assistance under the Emergency Gold Mining Assistance Act.

Mr. Abbott, the Canadian Finance Minister, in announcing this policy said that each mine now eligible for assistance under the Act will be required to choose in advance between having access to premium markets for its production or to continue receiving assistance for the remainder of the year. The question as to whether the Assistance Act would continue beyond the end of this year, either in its present or modified form, has still to be decided. Mr. Abbott explained that for the sale of gold to premium markets, export licences would be required, and that such licences would be available only to gold producers or their agents.

Gold, he said, could not be exported to premium markets in monetary form such as coins or Mint bars, but must be in the form of non-monetary gold of 22 carat or of a lower fineness, and exporters would be required to satisfy regulations of the Foreign Exchange Control Board regarding currency of payment, in order not to undermine or impair other countries' regulations. Thus, anyone applying for an export licence must provide evidence that the import licence had been obtained from the country of destination if such a licence is required by that country. The position of the Canadian Mint in the new policy was that it would act as a Customs' refiner for those mines electing to sell on the premium gold markets and would, for this service, charge an appropriate fee. Although the Mint would continue to buy all gold at official prices from producers electing to receive assistance, and would also pay the official price for any gold which producers opting for premium markets desire to sell to it, it would no longer sell gold to domestic processors or domestic manufacturers. These requirements, he explained, would be met by gold made available by gold producers at prevailing market prices.

The date on which the new arrangements will become effective has not yet been announced, but in any event there are a number of details which will need to be worked out before the mines will be able to take advantage of the new arrangement.

The Fund's announcement was welcomed in Southern Rhodesia and in West Africa as a step in the right direction, but no official comment from these two countries was forthcoming, as their dealings are controlled by the British Government. Now, however, it has been announced that Whitehall has no objection to these producers taking advantage of the new ruling.

In Australia the news to permit premium sales of gold has given much satisfaction, tempered by the uncertainty as to how these sales will be conducted in Australia, writes our Australian correspondent. Sir Arthur Fadden, Federal Treasurer, said that the Australian Government were making strong representations for an increased price of gold. He also announced that Australian sales of gold to the Bank of England had been suspended for nearly a year during which time new gold produced had been put to reserve to support Commonwealth credit in hard currency countries.

Slender Ore Reserves at Rosterman

Rosterman Gold Mines made a much better showing during 1950 than in the previous 12 months. Output and yield both improved and average working costs per ton were reduced substantially, but as can be seen from the table immediately below, estimated ore reserves are sufficient for only about 15 months at the present crushing rate. This is a source of considerable worry to the directors, especially in view of the fact that no substantial ore body was located during the year. Consequently, they are actively engaged in finding a property suitable for prospecting, and subsequent exploitation to improve the company's longer term prospects.

Year	*Milled (tons)*	*Yield (oz.)*	*Grade (dwt.)*	*Cost per ton* s.*	*d.*	*Ore Reserves Tons*	*Dwt.*
1950	42,195	13,171	6.24	61	8	52,105	7.16
1949	33,080	12,309	7.44	74	3	78,895	7.36

*Including development charges.

The ore reserve position is all the more depressing as the financial results were the best obtained since 1945, and the company was able to apply its net profit of £14,467 to reducing its debit balance which now stands at just under £40,000.

Year	*Gross Revenue* £	*Mining Costs* £	*Expenses* £	*Depreciation* £	*Net Profit* £	*Carry Forward* £
1950	162,231	135,907	3,092	8,331	14,467	—39,874
1949	120,949	122,737	3,955	7,373	—13,116	—55,293

Results for the first seven months of the current year indicate a slower tempo of operations at the mine, compared with the corresponding period in the previous year. Tonnage crushed declined to 18,641 (23,709), yielding 6,180 oz. (7,073), giving a profit of £8,045 compared with £11,991.

Mount Morgan Assesses Its Surgarloaf Area

The most important feature of Mount Morgan's operations during the year to June 30, 1951 was the virtual completion of the testing of the Sugarloaf Area. A report by the company's consulting geologist, Mr. H. Connelly, enclosed with the accounts, shows clearly that with the inclusion of the Sugarloaf tonnage Mount Morgan's consolidated ore reserves now presents a very strong position. Drilling has disclosed 9,000,000 tons of ore with an average assay of 2.3 dwt. of gold, 0.6 per cent copper and 12.0 per cent sulphur, while as part of the same deposit, there are 3,000,000 tons of quartz pyrite with 0.3 dwt. gold, 0.1 per cent copper and 12.0 per cent sulphur. Practically the whole of this 12,000,000 tons, Mr. Connelly states, can be mined by an extension of the present open cut with a reasonable economy in the ratio of overburden to ore, although there will be a heavy dilution of grade.

The accounts show that the total revenue of Mount Morgan for the year amounted to £1,876,094 against which charges, including £285,051 expended in discarding overburden, were £1,347,733, leaving a working profit of £528,361. Expenditure charged to the profit and loss account, including depreciation, amounted to £161,273 but after adding in interest received from investments of £3,619, net profit for the year was £370,707, compared with £391,447 previously. The allocation to capital redemption reserve was maintained at £20,000 and £21,000 was transferred to the employees' welfare fund as against £15,570 previously. The carry forward after dividends was £288,231 against £259,524 previously.

Since June a final dividend of 1s. per share has been declared, making 2s. per Ordinary share, which is the same as for the previous year.

Company Shorts

Total Working Profit of Rand Gold Mines, August.—The total estimated working profit of the gold mines of the Witwatersrand for the month of August, 1951, amounted to £3,810,593, which compares with the estimated working profit for July of £3,805,179.

Rantau Tin Dredging.—Anglo-Oriental (Malaya) Ltd. (London Tin subsidiary) has been authorized by the directors of Rantau Tin Dredging to announce that the No. 1 dredge (10 cu. ft. buckets, category "B") completed trials and started production on September 1.

Gold Mines of Kalgoorlie (In Voluntary Liquidation).—The London Secretaries of Gold Mines of Kalgoorlie have announced that at the extraordinary general meeting convened on October 9 the company was placed in voluntary liquidation. The new company, Gold Mines of Kalgoorlie (Aust.) Ltd., was formed. A letter from the liquidators to the stockholders enclosing a transfer form, will be issued on October 19.

New Kleinfontein's Share Issue.—In a circular to shareholders New Kleinfontein have announced that shareholders registered in the company's books by October 26 will be entitled to participate in the offer of 247,664 shares of £1 each at 25s. per share, in the ratio of one new for every six held. A further circular giving full information regarding the offer with forms of acceptance containing provision for renunciation, will be sent on November 5. The closing date of the offer will be Friday, November 23.

T.P.D. Maintains Dividends.—Gross revenue of Trinidad Petroleum Development for the year to July 31 was £1,668,137 compared with £1,424,378 previously. Expenses were higher and after charging £430,000 (£363,889) for taxation, net profit for the year was £310,787 against £299,054. General reserve received a further £100,000 and £25,000 (nil) was transferred to reserve for supplementary pensions. Dividend payments aggregated 16⅔ per cent, tax free, which is at the same rate as for the four preceding years. This required £185,694, and a further amount of £20,694 was appropriated to meet the payment on the 5½ per cent Preference shares, leaving the carry forward at £198,380, or virtually the same as in the previous year.

The Oceana Consolidated Company.—Although operations for the year to January 31, 1951 showed a loss of £372 (£418), good progress has been made on the company's Honeybird asbestos claims at Shabani which are under option from the Mashaba Rhodesian Asbestos Co. for the sum of £50,000, until the end of 1954. Operations on these claims began in January, 1950 and production began in a small way in September last. Subsequently, however, additional teething troubles were experienced, but in April of this year these had been overcome and production was proceeding steadily. The chairman, Mr. W. W. Parker, in his statement circulated with the report and accounts, said that since May last the plant has been running regularly, satisfactorily, and that it is hoped to make small profits from now on.

Siamese Tin Syndicate's Application Approved.—Lanark County Council on October 3 approved an application from the Siamese Tin Syndicate to carry out a prospecting programme over 22 sq. miles in the Leadhills/Wanlockhead area, Lanarkshire, Scotland, writes our Scottish correspondent. The Lanark County Council agreed that consent for the work be given for a limited period expiring on December 31, 1952, permission being given on condition that if the mines are abandoned, mine entrances will be completely sealed and protected and that refuse deposited on surface land be replaced where practicable, or the disposal otherwise be to the satisfaction of the Council.

Details of the Syndicate's interest in the Wanlockhead/Leadhills area were given in our issue of August 10.

St. Helena Quarterly Report—27 Per Cent Payability.—It is anticipated that the first monthly declaration of output from the St. Helena Gold Mines will be published in November. This has been announced in the company's September quarterly report which also states that tests on the reduction plant by milling low-grade development rock from surface dumps continued satisfactorily during the quarter, and that stoping has recently started. However, it will not be possible to supply the mill at a rate of about 50,000 tons per month until some time after the connection between Nos. 3 and 4 shafts on the 6th level has been completed. During the past three months, although development footage at 12,119 ft. (10,066 ft.) was higher than in the previous quarter, and a bigger footage was sampled on the basal reef, 3,730 ft. against 2,330 ft., payability was but 27 per cent with an average assay value of 11.3 dwt. over 21 in.

Capital expenditure during the September quarter amounted to £587,137 against £698,067 in the June quarter.

POWELL DUFFRYN LTD.

The Annual Accounts to March 31, 1951 were presented at the Annual General Meeting held on October 10. The following is an extract from the Statement of the Chairman—**Sir Herbert Merrett:**

Those who have followed the history of Powell Duffryn will realize that none of the assets upon which the Company was founded now remains in its ownership. When, after the vesting of the colliery assets, new ventures were embarked upon, it was known there would be a period during which certain investments would yield no income and development losses would have to be met. A policy of moderate dividend distribution and building up of the carry-forward of the Profit and Loss Account was adopted. We are passing through this period now but, with the expectation of new and substantial income from 1953 onwards, the specially created carry-forward may remain intact. It is, however, available for the payment of reasonable dividends if current earnings are insufficient.

Our Exporting Houses continue to trade in the movement of coal from one country to another. At unbelievable cost, this country has lost its hold on its export markets through inability to meet demand and British-owned coaling depots are largely dependent upon foreign coals to earn profits taxable in this country. It would be idle to pretend that this is a passing phase.

Satisfactory profits are expected from the expansion of the Group's direct interest in the Oil Marketing Industry through our 50 per cent partnership with Socony-Vacuum Oil Co., Inc. of New York in the well-known British Company, Vacuum Oil Co., Ltd.

The construction of the Refinery on the Coryton site has proceeded favourably and amplifications have been made in the original planned layout, chiefly by the incorporation of a Catalytic Cracking Unit. We, as partners in this undertaking, have not neglected the opportunity to invest further capital in what may prove to be the last word in Refinery construction.

The clearing up stage of compensation for the mines and ancillaries proceeds at snail's pace. Attempts to obtain voluntary agreement for the division of the area allocation require enormous effort and patience. If voluntary effort is unsuccessful, settlement through the Valuation Board may be deferred for many years.

Now that commitments of a long term nature have been entered into, the Board feels that the issued capital can be fully employed and that it will not be necessary to repay any part of it.

In order to achieve greater efficiency and economy, it has been decided that two of the Group's principal Houses, namely, Cory Brothers & Co., Ltd. and Gueret, Llewellyn & Merrett Ltd. should be merged. The combined Companies will operate as Cory Brothers & Co., Ltd.

Production at the Hayes factory of Powell Duffryn Carbon Products Ltd., is proceeding favourably and sales are satisfactory. We have recently formed a new Company in the United States jointly with the well-known American Company, the Great Lakes Carbon Corporation. The new Company, the British-American Carbon Corporation, represents a 50/50 partnership.

When all our coal mines, coke oven plants, tar refineries and power stations were taken from us on January 1, 1947, we decided that the great knowledge and experience accumulated over the years should be remobilized and placed at the disposal of clients in this country and throughout the world.

Powell Duffryn Technical Services Ltd. was, therefore, formed as a consultant organization to give impartial advice and service on all matters connected with the finding and mining of coal and its treatment, processing and efficient utilization. These services have been welcomed by Governments and private clients throughout the world. During the past four years we have included amongst these clients the Governments of Pakistan, Ceylon, Southern Rhodesia, Nigeria British North Borneo and Sarawak, Nyasaland, the State Governments of Queensland and Victoria, and, in Europe, the Governments of Denmark, Greece, and Austria. In several of these cases we still have important work in hand.

In this country, the services which the Company can offer on fuel utilization are being appreciated and used by consumers to an increasing extent year by year. There never was a time when fuel economy was of greater importance to the nation and to industry, and here we offer a contribution of great value to those concerned with this vital and pressing problem.

In France, we are recovering from the dislocation caused by the war, and have commenced the erection of new coal handling installations on the River Seine.

In Spain, since the merger of our Spanish Company with the well-known firm of Duro-Felguera, whose wide range of activities includes the production of coal and steel, our business has progressed steadily in volume and earnings, and its prospects are distinctly favourable.

The Report and Accounts were adopted.

Topical News in Brief

Sweden Imports Indian Coal.—Sweden has begun to import coal from India as supplies from Britain and Poland are insufficient. A total of 8,000 tons arrived recently in Sweden from India and, despite the distance, is cheaper than Polish coal.

Coal Rationing Introduced in Japan.—The Japanese Government has introduced coal rationing for key industries as long as the dry spell and the coal shortage combine to make an acute power shortage. The Cabinet also agreed to set up a 3,000 million yen fund to increase coal production.

First British Inquiry for Japanese Steel.—The Yahata Iron Works has recently received inquiries from a British trading firm for some 400,000 tons of steel sheets and bars, according to the *Nihon Keizai Shimbun*. If the deal materializes, it will be the first time in history that Japanese steel has been exported to Britain.

Argentina Invites Tenders for Coaling Port.—The Argentine Ministry of Public Works has called for tenders for the installation of an 87,466,000 pesos coaling port in Rio Gallegos in the extreme south of Patagonia. Foreign and local firms have been invited to send their offers before February 14, 1952. According to a Reuter report from Buenos Aires, the port will have to be completed within four years and will be used for the shipment of coal from the Rio Turbio mines in the Andes mountains. The mines and Rio Gallegos were recently linked by a short gauge railway.

O.E.E.C. to Study Organization of Scientific Research in Europe.—A group of scientists from 12 member countries of the Organization for European Economic Co-operation met recently in Paris to study the organization of applied scientific research in Europe. This study forms part of the O.E.E.C. Technical Assistance scheme. Following a preliminary meeting on October 6, the group, which includes some 30 specialists in this field, will visit government and private research establishments in France, Italy, Germany, Denmark, Sweden, the Netherlands, Belgium, and the U.K. The scientific research branches of universities, colleges and technical institutes will also be inspected during their tour. Finally, the experts will gather in London on November 15 to discuss what they have seen and to draw up their report for the O.E.E.C. The group will be accompanied by three U.S. experts and will later visit the U.S.A. to study American methods of research organization.

Mining Men and Matters

Dr. James Boyd, who is resigning as director of the U.S. Bureau of Mines, is joining the executive staff of the Kennecott Copper Corporation.

Mr. W. H. Geikie has resigned from the board of Lyndhurst Deep-Level (Gold and Silver).

Mr. K. C. G. Heath has been transferred to Johannesburg as assistant to the consulting engineer, Rhodesian section, Anglo American Corporation of South Africa.

Mr. C. V. Hickson has been transferred from Chingola to the Central Research Laboratories of the Rhokana Corporation at Nkana, where he is engaged as flotation metallurgist.

The Institution of Mining and Metallurgy will hold its first ordinary general meeting of the current session in the Apartments of the Geological Society, Burlington House, Piccadilly, London, W.1, on Thursday, October 18 at 5.30 p.m., when the following papers will be submitted for discussion: "Heavy metals in vegetation as a guide to ore: a biogeochemical reconnaissance in West Africa," by Dr. J. S. Webb and Mr. A. P. Millman; "The geology of Hemerden wolfram mine, Devon," by Mr. James Cameron; and "The determination of the mass concentration of air-borne dusts: an electrical sampling pump for use with volatile filters," by Dr. P. F. Holt.

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Printed in England for The Mining Journal Ltd. by Samuel Sidders & Son Ltd., 115, Salusbury Road, London, N.W.6. Registered as a Newspaper.